Modular type unit

Block type unit (E type, SU type, H type)

XGB Series

Troubleshooting Manual

Safety Instructions

Read this manual carefully before servicing or inspecting this equipment.

Keep this manual within easy reach for quick reference.

Quick Reference Table

The following tables contain situations frequently encountered by users while working with PLC.

Refer to the typical and practical situations in the table to quickly and easily locate answers to your questions.

Situation	Reference
PLC does not turn on.	P. 17
ERR LED is flickering and PLC cannot turn to RUN.	P. 17
I forgot the program password of PLC.	P. 25
The communication does not work frequently.	P. 28
The communication does not work. I can find only transmission information.	P. 34
The low battery error occured.	P. 23
I would like to know about CPU error code.	P. 41
I would like to check the wire status of RS485 communication.	P. 30
CW output LED is flickering.	P. 38
I would like to know about the product information.	P. 6
P2P parameter setting error is on.	P. 33
I would like to know about the working status according to the environment condition.	P. 39
The positioning error code occured.	P. 43
The inputs & outputs are not working properly.	P. 21
I would like to know about Cnet error code.	P. 42

Contents

- **INTRODUCTION** 3
  - **Manual Structure** 3
- **APPLICABLE PRODUCTS** 4
- **PRODUCTS IDENTIFICATION** 5
- **RELEVANT MANUALS** 7
- **SAFETY PRECAUTIONS** 8
- **REVISION HISTORY** 10

1 TROUBLESHOOTING METHODS 11

1.1 CPU 11
1.1.1 Diagnosis Function 11
1.1.2 Troubleshooting That According to LED Status 17
1.1.3 Troubleshooting When The Battery is Abnormal 23
1.1.4 How to Use 'Clear All PLC' Function 25
1.2 Built-in C-net Diagnosis 28
1.2.1 Communication Diagnosis by Frame Analysis 31
1.2.2 Troubleshooting by Error 33
1.3 Built-in Position Control Diagnosis 36
1.3.1 How to Check Error Code 36
1.3.2 Check by Using the LED 37
1.3.3 If the Motor Doesn't Work 38

2 MAINTENANCE 39

2.1 Maintenance 39
2.2 Daily Inspection 40
2.3 Periodic Inspection 40

3 ERROR CODE LIST 41

3.1 CPU 41
3.2 Built-in C-NET 42
3.2.1 XGT Server Error code 42
3.2.2 Modbus Server Error Code 43
3.2.3 P2P Client Error Code 43
3.3 Built-in Position Control 43
3.4 Built-in PID Function 50
3.4.1 Error Code 50
3.4.2 Warning Code 51

Introduction

Manual Structure

1 Troubleshooting Methods

1.1 CPU
1.1.1 Diagnosis Function
1.1.2 Troubleshooting That According to LED Status
1.1.3 Troubleshooting When The Battery is Abnormal
1.1.4 How to Use 'Clear All PLC' Function

This chapter contains the diagnosis functions and recommended actions of CPU of XGB PLC when the malfunction occurs.

If the malfunction is not solved, contact your vendor or LS IS directly.

1.2 Built-in C-net Diagnosis
1.2.1 Communication Diagnosis by Frame Analysis
1.2.2 Troubleshooting by Error

This chapter contains the diagnosis functions and recommended actions of C-net of XGB PLC.

Check the communication status via frame analysis.

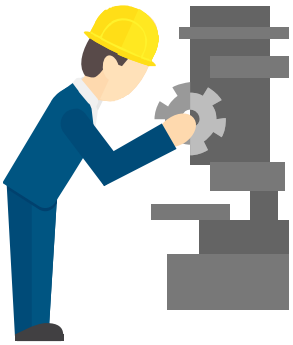
1.3 Built-in Position Control Diagnosis
1.3.1 How to Check Error Code
1.3.2 Check by Using the LED
1.3.3 If the Motor Doesn't Work

This chapter contains the way to check the error code of positioning and the recommended actions according to LED status.

2 Maintenance

2.1 Maintenance
2.2 Daily Inspection
2.3 Periodic Inspection

This chapter contains the maintenance and inspections of XGB PLC. There are daily and periodic inspections.



3 Error Code List

3.1 CPU
3.2 Built-in C-NET
3.2.1 XGT Server Error code
3.2.2 Modbus Server Error Code
3.2.3 P2P Client Error Code
3.3 Built-in Position Control
3.4 Built-in PID
3.4.1 Error Code
3.4.2 Warning Code

This chapter contains the error code and recommended actions

Applicable Products

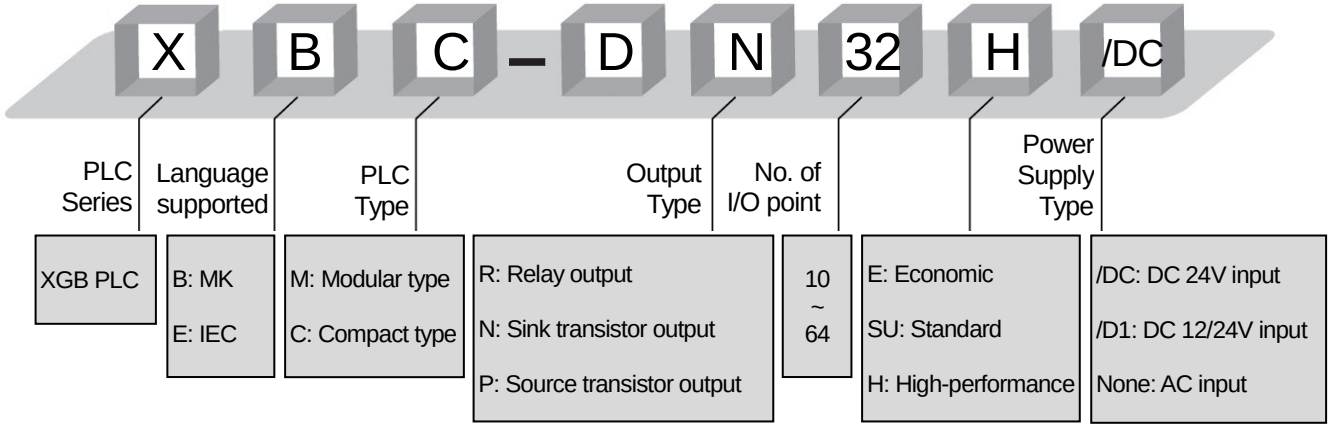
This troubleshooting manual should be used for the following products:

Item			Model
Basic unit	Modular type unit		XBM-DR16S
			XBM-DN16/32S
	Block type unit	H type	XB(E)C-DR32/64H
			XB(E)C-DN32/64H
			XEC-DP32/64H
			XBC-DR32H/DC
			XBC-DR64H/DC
			XBC-DN32H/DC
			XBC-DN64H/DC
			XEC-DR32H/D1
			XEC-DR64H/D1
		SU type	XB(E)C-DR20/30/40/60SU
			XB(E)C-DN20/30/40/60SU
			XB(E)C-DP20/30/40/60SU
		E type	XB(E)C-DR10/14/20/30E
			XB(E)C-DN10/14/20/30E
			XB(E)C-DP10/14/20/30E

Products Identification

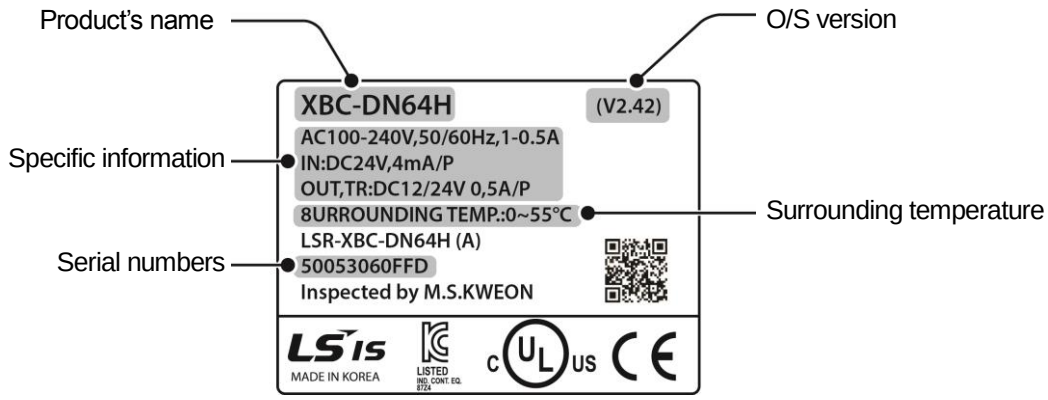
1) The product naming method of XGB Series PLC as described below. The following description will help you to classify XGB PLC product.

Ex) XBC-DN32H/DC



2) The basic information can be recognized by product label. Please refer to detail information of product as below:

Ex) XBC-DN64H



Title	Description
Product's name	Indicates the name of the product
O/S version	Indicates the O/S version of the product
Specific information	Indicates the standard of power supply & Input & Output
Surrounding temperature	Indicates the surrounding temperature which the product can operate
Serial numbers	Serial numbers consist of 11-digit numbers

Relevant Manuals

The troubleshooting manual also related to following manuals. Please refer to following manuals for your reference.

You can connect our website (http://www.lsis.com/) and download the information as a PDF file.

Title	Description	Remarks
XGB Hardware User's Manual	It describes how to use the specification of power/input /output/expansion modules, system configuration and built-in High-speed counter for XGB basic unit.	
XGB Hardware User's Manual (IEC)	It describes how to use the specification of power/input /output/expansion modules, system configuration and built-in High-speed counter for XGB (IEC) basic unit.	
XGB Economic/Standard User's Manual	It describes how to use the specification of power/input /output/expansion modules, system configuration and built-in High-speed counter for XGB Economic/Standard unit.	
XGB Economic/Standard User's Manual (IEC)	It describes how to use the specification of power/input /output/expansion modules, system configuration and built-in High-speed counter for XGB (IEC) Economic/Standard unit.	
XGB Cnet I/F User's Manual	It describes how to use built-in communication function for XGB basic unit and external Cnet I/F module.	
XGB Position User's Manual	It describes how to use built-in positioning function for XGB unit.	

Safety Precautions

For your safety and effective operation, please read the safety instructions thoroughly before using the product.

Instructions are separated into “Warning” and “Caution”, and the meaning of the terms is as follows;

⚠ Warning

This symbol indicates the possibility of serious injury or death if some applicable instruction is violated

Caution

This symbol indicates the possibility of slight injury or damage to products if some applicable instruction is violated

Safety instruction

⚠ Warning

- Do not touch the terminals when power source is supplied to the product. Doing so may cause the product to malfunction or result in electric shock.
- Do not allow objects, such as metal fillings or other debris inside the product. Doing so may cause the product to malfunction or result in a fire.
- Please, install protection circuit on the exterior of PLC to protect the whole control system from any error in external power or PLC module.
- Never connect the overload than rated to the output module nor allow the output circuit to have a short circuit, which may cause a fire.
- Before PLC system is powered on, be sure that all the covers of the terminal are securely closed. If not, electric shock may be caused.
- Don’t touch the terminal when powered. Electric shock or abnormal operation may occur.
- Prior to cleaning or tightening the terminal screws, let all the external power off including PLC power. If not, electric shock or abnormal operation may occur.
- Don’t let the battery recharged, disassembled, heated, short or soldered. Heat, explosion or ignition may cause injuries or fire.
- Do not touch the terminals of the product during the operation or right after power is off. Doing so may cause the burns.
- Ensure that the correctly rated power supply is connected to the device. Be careful when making power connections as errors may damage the device.

Caution

- Input/output signal or communication cables must be separated by at least 100 mm from main power supply cables (high voltage, large current). Installing signal or communication cables close to main power supply cables may expose the device to noises and may cause the product to malfunction.
- Use PLC only in the environment specified in PLC manual or general standard of data sheet. If not, electric shock, fire, abnormal operation of the product or flames may be caused.
- Be sure that I/O or extension connecter is correctly secured. If not, electric shock, fire or abnormal operation may be caused.
- If lots of vibration is expected in the installation environment, don't let PLC directly vibrated. Electric shock, fire or abnormal operation may be caused.
- Don't remove PCB from the module case nor remodel the module. Fire, electric shock or abnormal operation may occur.
- Prior to installing or disassembling the module, let all the external power off including PLC power. If not, electric shock or abnormal operation may occur.
- Let the wiring installed correctly after checking the voltage rated of each product and the arrangement of terminals. If not, fire, electric shock or abnormal operation may be caused.
- Do not let the heavy product put on the wires. If not, a fire, damaged wires may be caused.
- Product or battery waste shall be processed as industrial waste. The waste may discharge toxic materials or explode itself.

Revision History

Version	Date	Remark	Page
V1.0	2015.04	1. First Edition	-
V1.01	2015.04	1. Words Revision	-

1 Troubleshooting Methods

Troubleshoot XGB products with diagnosis functions as bellows. If the problem or faulty is not solved with this troubleshooting manual, contact your vendor or LS IS directly.

1.1 CPU

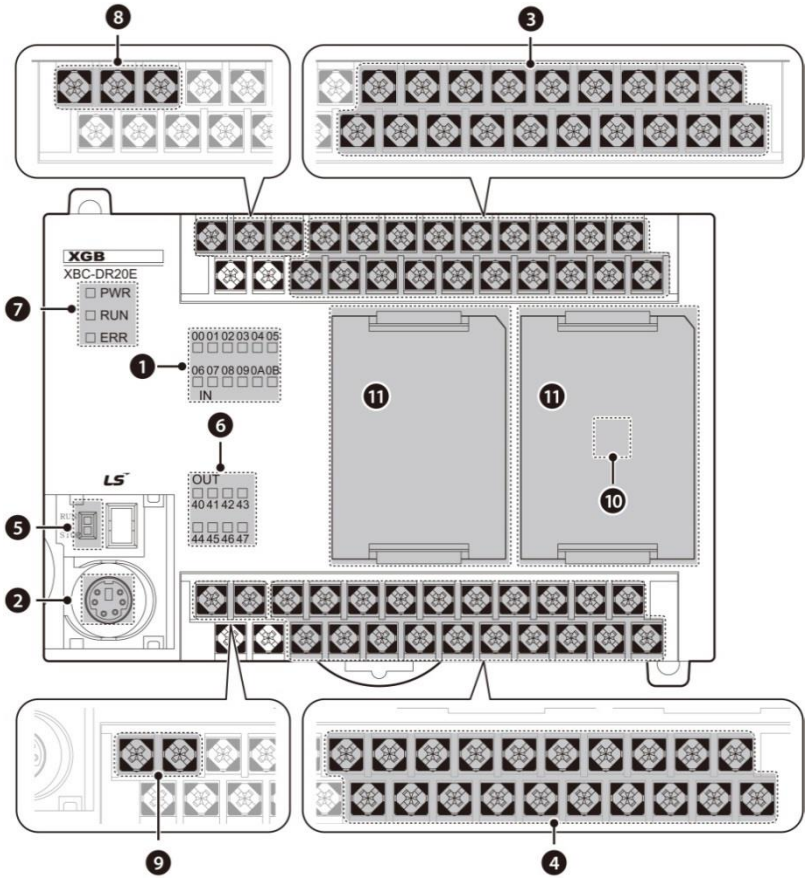
1.1.1 Diagnosis Function

Following contents show the name of parts and functions. This information should be checked in advance before the diagnosis function.

Caution

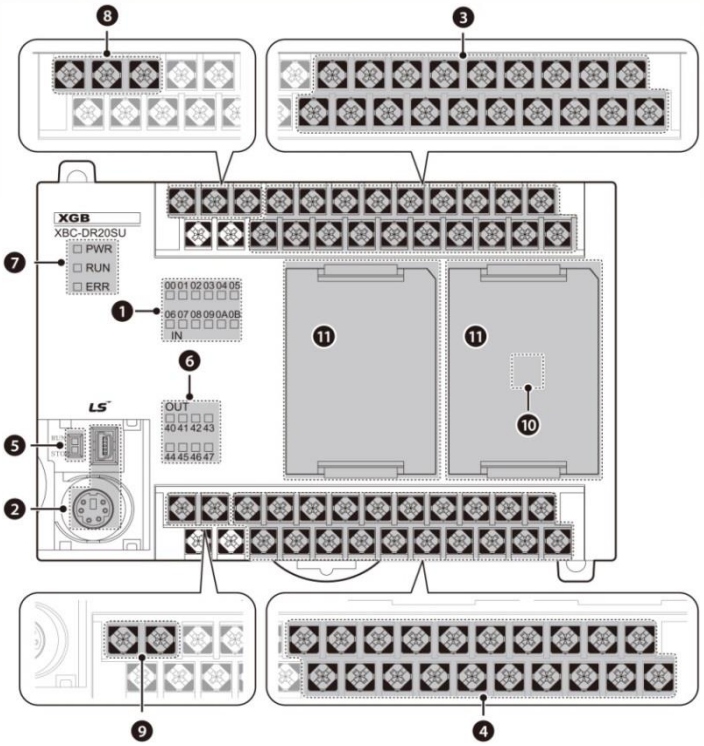
O/S mode DIP switches use only for software upgrade. Do not use them during the operation.
(E type, SU type, H type)

■ **E type**



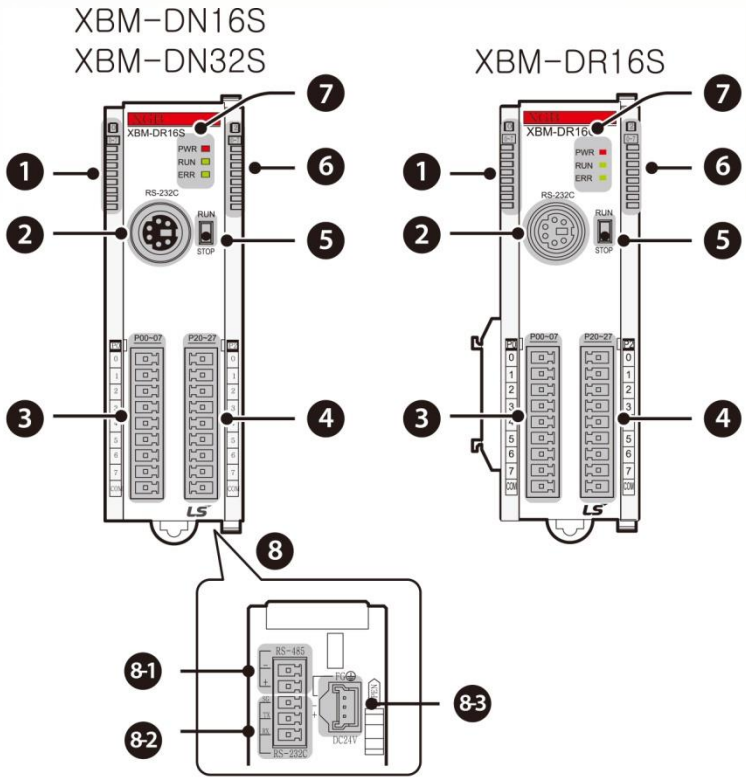
No.	Name	Description
1	Input indicator LED	Input indicator LED
2	PADT connecting connector	PADT connector • RS-232C 1 Channel
3	Input terminal block	Input terminal block
4	Output terminal block	Output terminal block
5	RUN/STOP mode switch	Sets the operation mode of main unit • STOP → RUN: execute operation of program • RUN → STOP: stop operation of program (In case of STOP, remote mode is available)
6	Output indicator LED	Output indicator LED
7	Status indicator LED	It indicates CPU module's status • PWR(Red on): Power status • RUN(Green on): RUN status • Error (Red flickering): In case of error, it is flickering.
8	Built-in communication Connecting connector	Built-in RS-232C/485 connecting connector
9	Power supply connector	AC100~240V power supply connector
10	OS mode dip switch	Dip switch for setting O/S download/Operation mode • On: Boot mode, available to download O/S • Off: User mode, available to download program using PADT
11	Option board holder	For connection option board

■ SU type



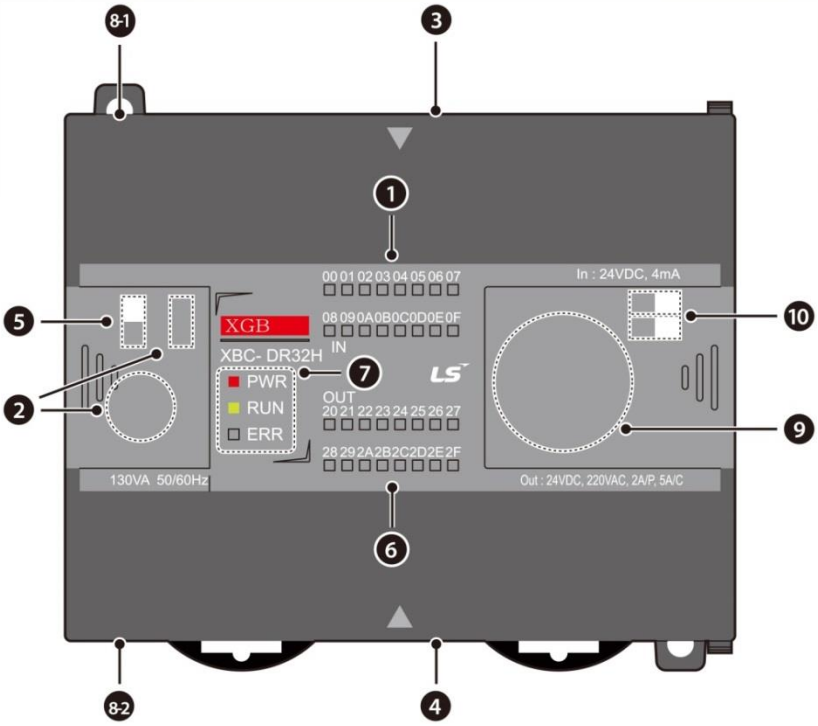
No.	Name	Description
1	Input indicator LED	Input indicator LED
2	PADT connecting connector	PADT connector • RS-232C 1 channel, USB 1 channel
3	Input terminal block	Input terminal block
4	Output terminal block	Output terminal block
5	RUN/STOP mode switch	Sets the operation mode of main unit • STOP → RUN: execute operation of program • RUN → STOP: stop operation of program (In case of STOP, remote mode is available)
6	Output indicator LED	Output indicator LED
7	Status indicator LED	It indicates CPU module's status • PWR(Red on): Power status • RUN(Green on): RUN status • Error(Red flickering): In case of error, it is flickering
8	Built-in communication connecting connector	Built-in RS-232C/485 connecting connector
9	Power supply connector	AC100~240V power supply connector
10	OS mode dip switch	Dip switch for setting O/S download/Operation mode • On: Boot mode, available to download O/S • Off: User mode, available to download program using PADT
11	Option board holder	For connection option board

■ XBM-S type



No.	Name		Description
1	Input indicator LED		Input indicator LED
2	PADT connecting connector		PADT connecting connector
3	Input connector and terminal block		Input connector and terminal block
4	Output connector and terminal block		Output connector and terminal block
5	Key switch		RUN / STOP Key switch • In case of STOP mode, Remote mode changeable
6	Output indicator LED		Output indicator LED
7	Status indicator LED		It indicates CPU module's status • PWR(Red) : Power status • RUN(Green) : RUN status • STOP mode : Off / RUN mode : On • ERR(Red) : in case of error, it is flickering
8	8-1	Built-in RS-485 connecting connector	Built-in RS-485 connecting connector • "+" , "-" terminal connecting connector in RS-485 communication
	8-2	Built-inRS-232C connecting connector	Built-in RS-232C connecting connector • "TxD" , "RxD" , "GND" terminal connecting connector in RS-232C communication
	8-3	Power supply connector	Power supply connector (24V)

■ H type



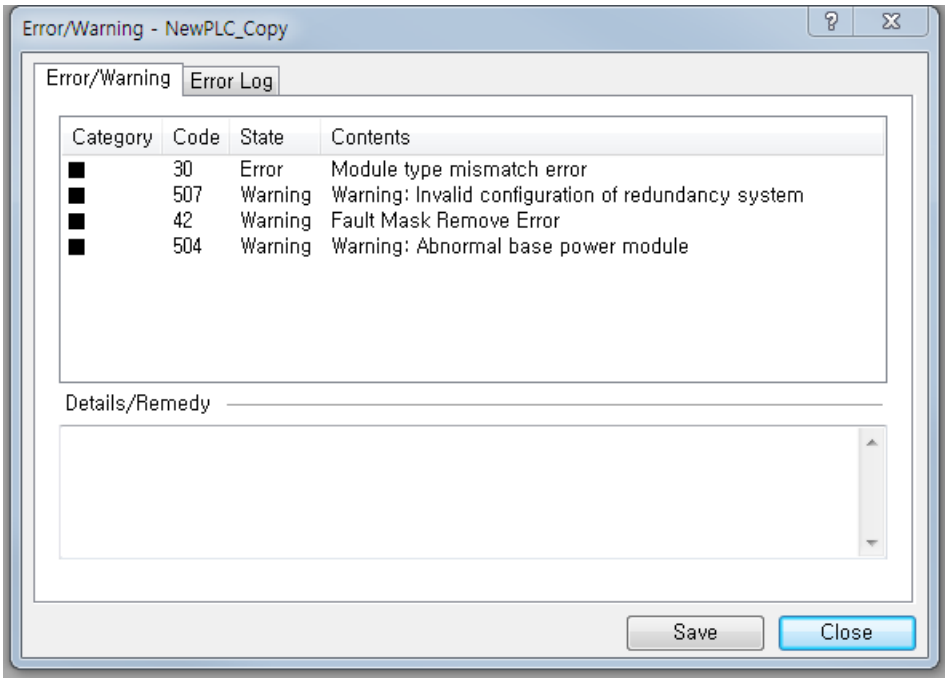
No.	Name		Description
1	Input indicator LED		Input indicator LED
2	PADT connecting connector		PADT connecting USB 1 channel, RS-232C 1 channel connector
3	Input connector and terminal block		Input connector and terminal block
4	Output connector and terminal block		Output connector and terminal block
5	Key switch		RUN / STOP Key switch • In case of STOP mode, Remote mode changeable.
6	Output indicator LED		Output indicator LED
7	Status indicator LED		It indicates CPU module's status. • PWR(Red): Power status • RUN(Green): RUN status • STOP mode: Off/ RUN mode : On • Error(Red): In case of error, it is flickering.
8	8-1	Built-in RS-232C / RS-485 Connecting connector	Built-in RS-485 connecting connector • "+" , "-" terminal connecting connector in RS-485 communication Built-in RS-232C connecting connector • "TxD" , "RxD" , "GND" connecting connector in RS-232C
	8-2	Power supply connector	AC100~240V power supply connector
9	Battery holder		Battery (3V) holder
10	Mode switch		Program mode and O/S download mode select switch

Although PLC is a high-tech product and highly related to software, but please visually check the appreance and internal parts whether there are exterior damage exist.

If there is no exterior damage and burn, then find the cause of error in XG5000.

XGB PLC can record every errors and warnings during operation so that help users to identify the problem easily.

The user can click ‘error/warning’ tab of ‘Online’ to check current errors and pervious error log. These errors/warnings can be removed by referring ERROR CODE list which is listed in Chapter 3.



Item	Description	Remarks
Error/Warning	Display the current error/warning	-
Error log	Display a log of error/warning occurred	Saving up to 100

Remark

The records will remain until select “Delete” function in the XG5000.
If error/warning records will be automatically removed from the first record if it exceeds 100.
In short, 100 latest error/warnings will remain.

1.1.2 Troubleshooting That According to LED Status

When the malfunction appears, the short discovery and corrective action is needed for speedy operation of system.

First of all, the following shows the basic instruction for troubleshooting. Please follow these steps before doing the recommended actions according to LED status.

Visual inspection

- Machine operating condition (in stop and operation status)
- Check if Power is on or off
- Status of I/O devices
- Condition of wiring (I/O wires, extension and communications cables)
- Display states of various indicators (such as POWER LED, RUN LED, ERR LED and I/O LED) after checking them, connect peripheral devices and check the operation status of the PLC and the program contents.

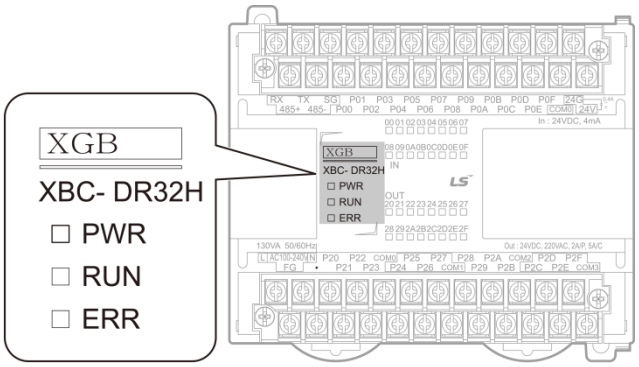
Check if any malfunction exists

- Switch to the STOP position, and then turn the power on and off
- Check the status of PLC and external devices
- Check the status of input & output and load condition
- Check if PLC program is malfunctioning

Here is the recommended action according to the status of LEDs on the cover.

■ Troubleshooting when PWR(Power) LED is off

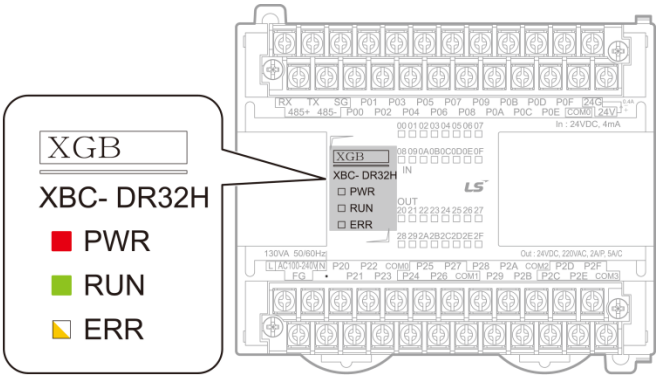
LED status



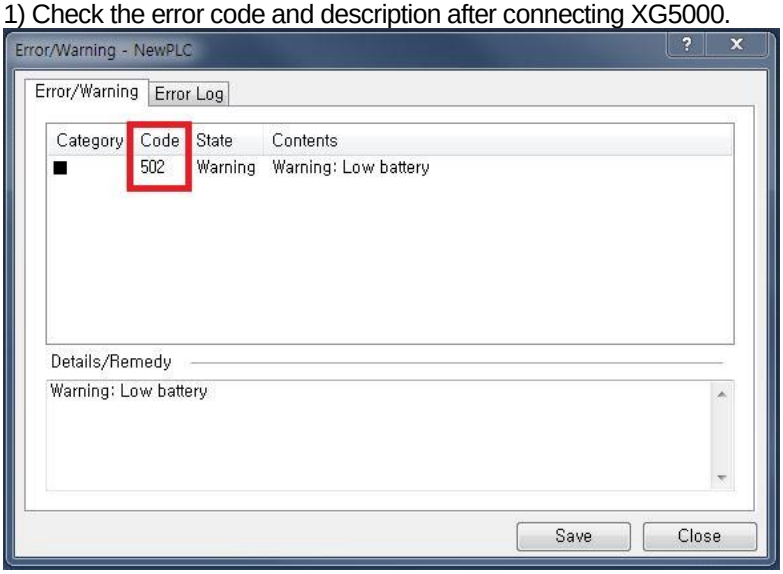
Check point	Recommended Action
Power supp ly	1) Check the connection between the wires and the supplied voltage points. 2) Check the wires of supplied voltage. They should be in the fixed points of PLC. 3) Check the external devices and voltage.
The supplied voltage	Check the voltage from the power supply if the value of voltage is wrong. (AC100~240V : AC85~264V, DC24V : DC19.2V~28.8V)
Current consumption capacity	1) Check the current consumption and remove the excess current. 2) Power Off and On
Remarks	If the problem is not solved with diagnosis function and recommended action, please contact your vendor or LS IS directly.

■ Troubleshooting when ERR(Error) LED is flickering

LED status

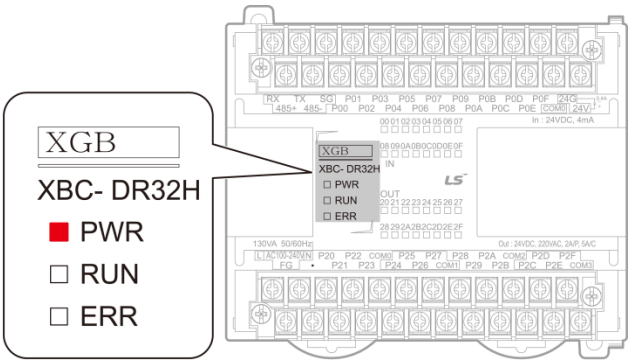


Indicates the LED is flickering

Check point	Recommended Action
Error code (XG5000)	1) Check the error code and description after connecting XG5000.  2) Remove the cause of errors by referring to the error code.
Remarks	If the problem is not solved with diagnosis function and recommended action, please contact your vendor or LS IS directly.

■ Troubleshooting when RUN, STOP LEDs are off

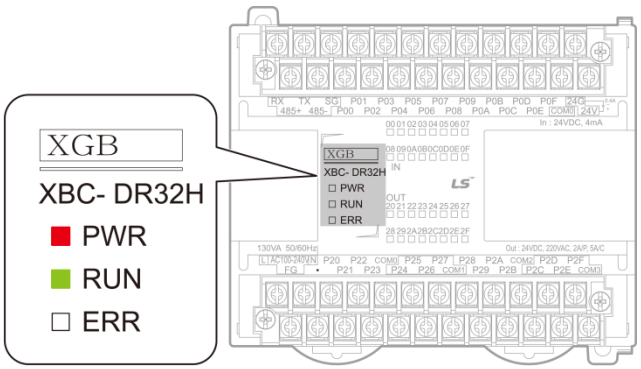
LED status

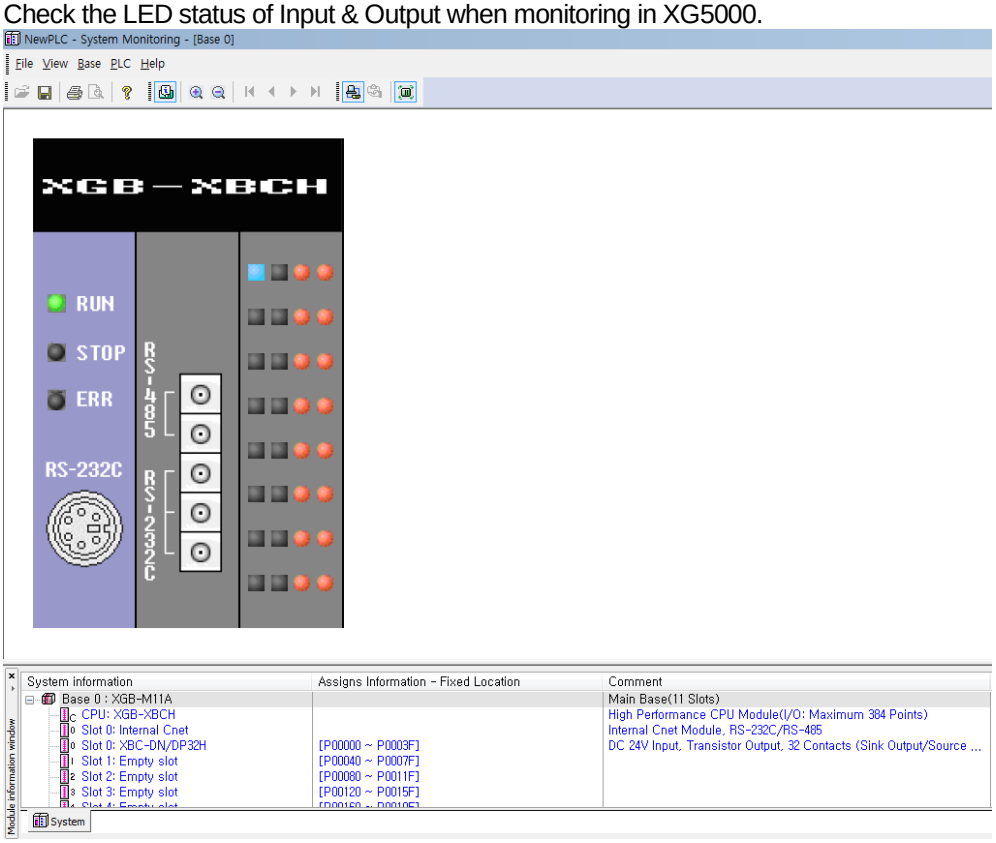


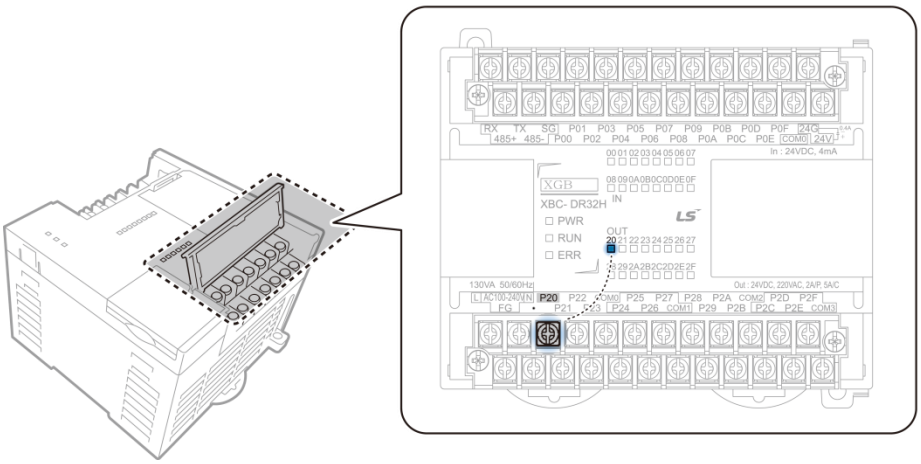
Check point	Recommended Action
Power supply & DIP switches	1) Power Off and On 2) Check O/S DIP switches - The switches should be on the right side. - Do not use the switches.
Remarks	If the problem is not solved with diagnosis function and recommended action, please contact your vendor or LS IS directly.

■ Troubleshooting when the status of input & output is abnormal even if all LEDs are normal

LED status



Check point	Recommended Action
XG5000 'System Monitor'	Check the LED status of Input & Output when monitoring in XG5000. 
The wiring status	Check PLC program and the wires of input & output whether it connected corretly
The status of the load	Check the load condition connected input & output points. Check the connection status on the each point in PLC.

The status of input & output LEDs	Check the input & output LED status.
	Check the information of input & output points through the user's manual. Check if LED is on or off after connecting faulty points of input & output. 
Remarks	If the problem is not solved with diagnosis function and recommended action, please contact your vendor or LS IS directly.

1.1.3 Troubleshooting When The Battery is Abnormal

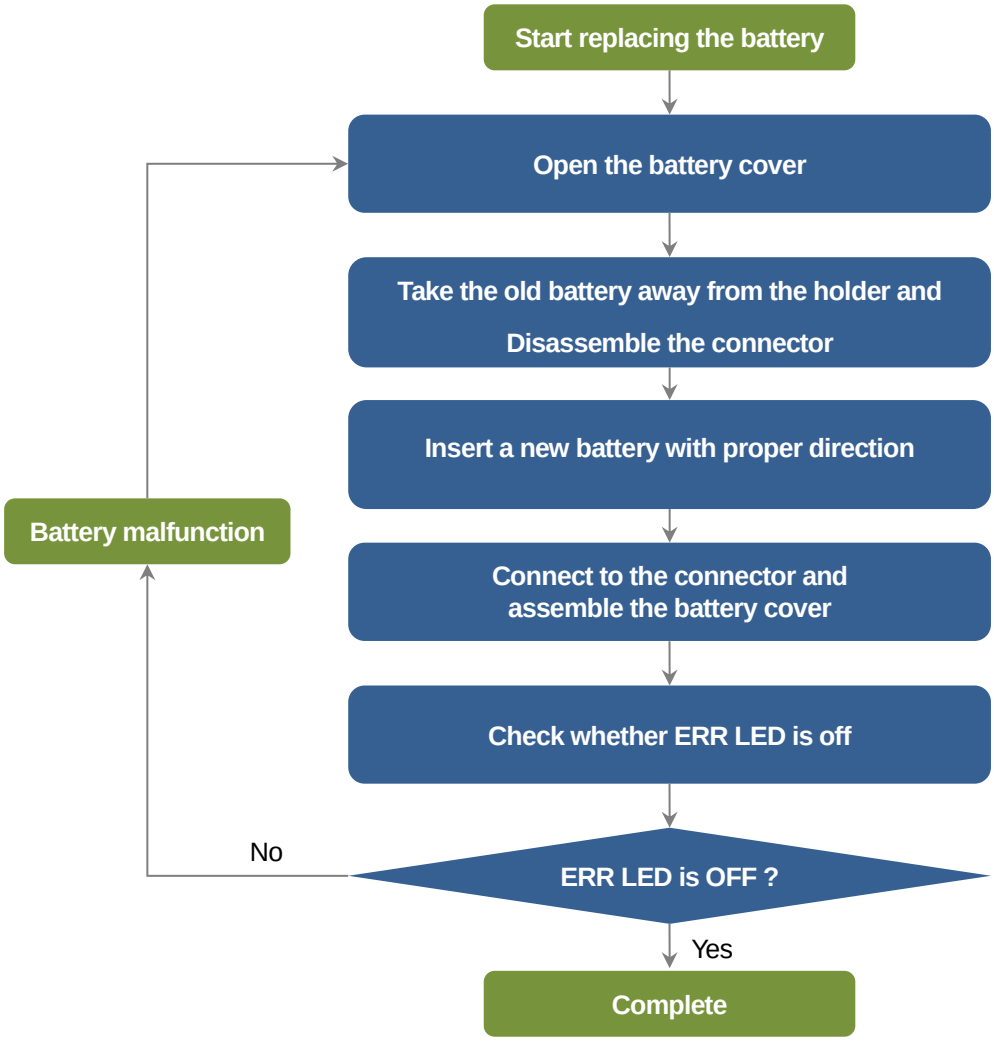
The battery is only applied to XGB H type PLC. There would be an error code for the battery showing up in XG5000 when using XGB H type PLC.

The user should periodically change the battery which is used for saving programs and back-up data in case of power failure. Though the user eliminates the battery, it works for 30 minutes by super capacitor. But the battery should be replaced with a new one as soon as possible.

Generally, the battery should be replaced when the following error codes occur in XG5000.

Error code	Error cause	Recommended action
500	Data memory back-up error	If not error in battery, power should be supplied again. (Remote mode is switched to STOP mode)
502	Low battery error	Replace with a new battery

Start replacing a new battery by referring the following steps.


Start replacing the battery
Open the battery cover
Take the old battery away from the holder and
Disassemble the connector
Insert a new battery with proper direction
Connect to the connector and
assemble the battery cover
Check whether ERR LED is off
ERR LED is OFF ?
No
Yes
Battery malfunction
Complete

XGB Series PLC does not use the battery for the data back-up. Only XGB H type PLC uses the battery for the data back-up. In case of XGB series PLC except for H type, data is kept by super capacitors.

The data back-up time can be extended using RTC option for only “SU” type and “E” type. The following table shows the data back-up time of main unit.

Item	Back-up time		Remarks
XBM-DR16S, XBM-DN16/32S	When using CPU individually (Super capacitor back-up)	10 days	Normal temperature(25°C)
XB(E)C “SU” type	When using CPU individually (Super capacitor back-up)	18 days	
	When using RTC option	3 years	
XB(E)C “E” type	When using CPU individually (Super capacitor back-up)	5 days	
	When using RTC option	3 years	

Caution

- Above data back-up time can be different according to temperature condition.
- In case of XGB H type PLC, the exchange cycle of the battery is usually 3 years.
- When you use the super capacitor for data back-up, super capacitor should be charged enough while power is on over 30 minutes.
  (If there is no enough time to charge the super capacitor, ‘data backup error’ can shows up)

1.1.4 How to Use ‘Clear All PLC’ Function

When you forget the passwords of PLC program, PLC program can be initialized using ‘Clear All PLC’ function. This function is to completely remove parameters, programs, data and passwords. XG5000 should be more than V3.64.

‘Clear All PLC’ function can be used in the below condition.

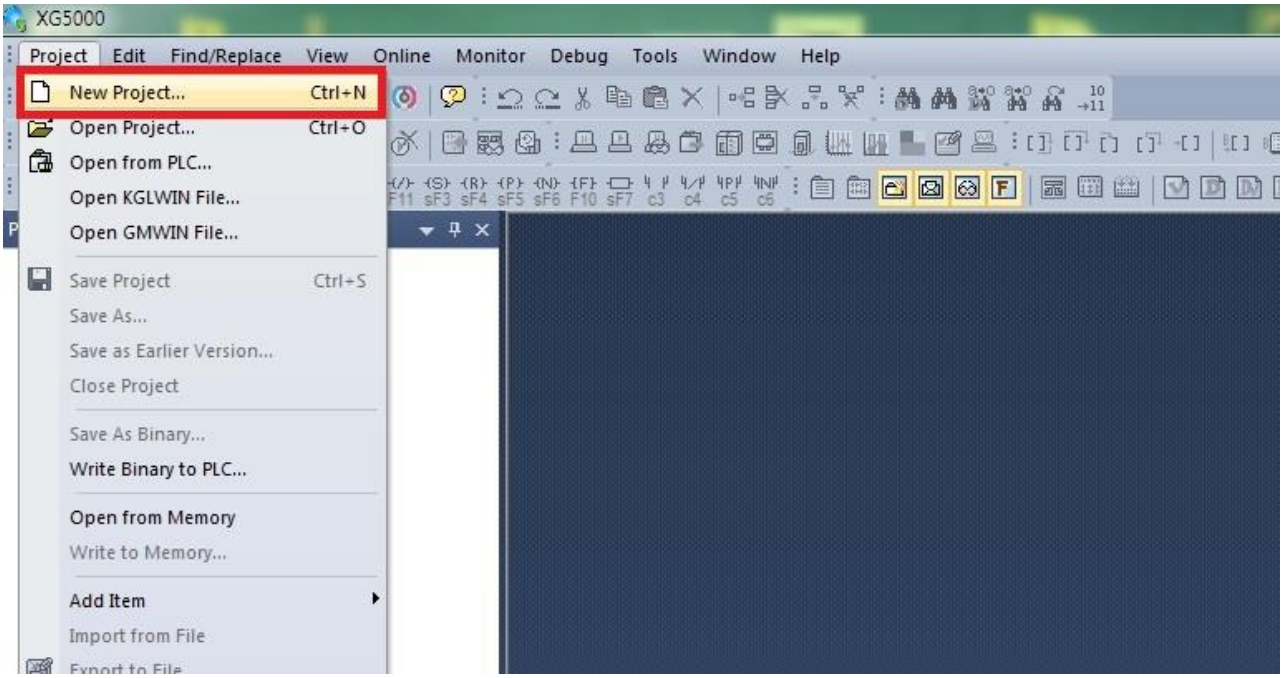
Item	OS version
XBM	More than V3.10
XBC H type	More than V2.03
XBC SU type	More than V1.00
XBC E type	More than V1.00
XEC H type	More than V1.40

Caution

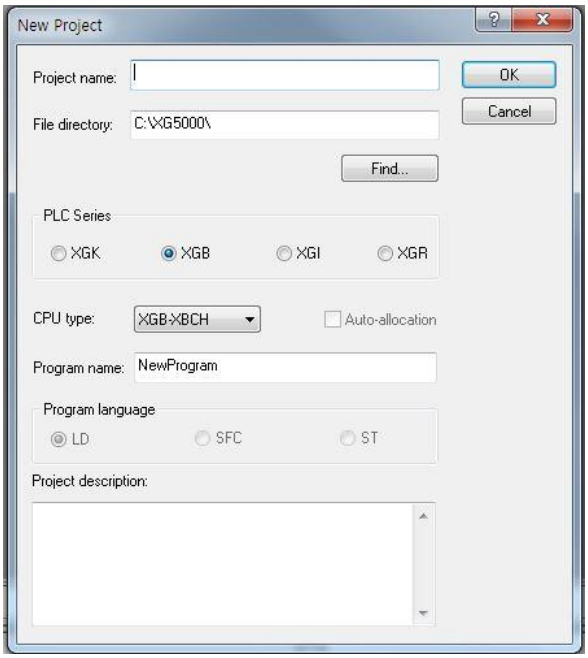
XGB PLC should be in Remote/Stop mode during ‘Clear All PLC’ function.

Follow the below steps with screen-shot images.

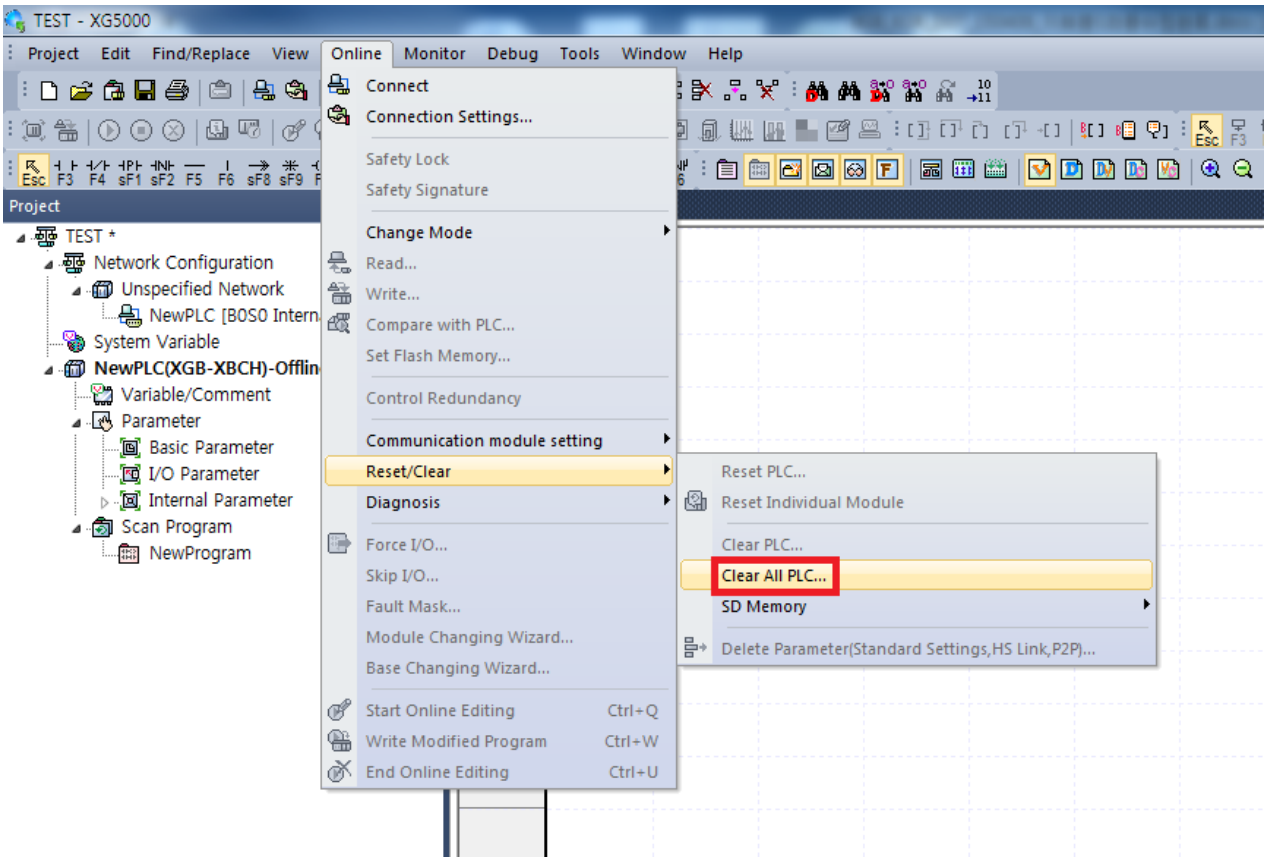
1) Start XG5000 and click ‘new project’



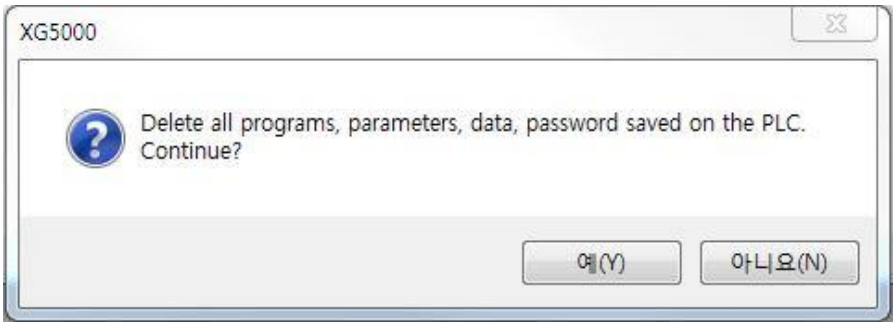
2) Choose PLC and CPU type and create a new project



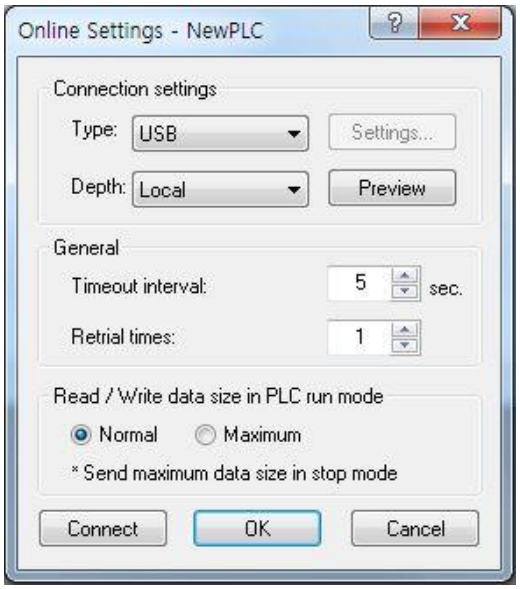
3) After making a new project, click **'Clear All PLC'**



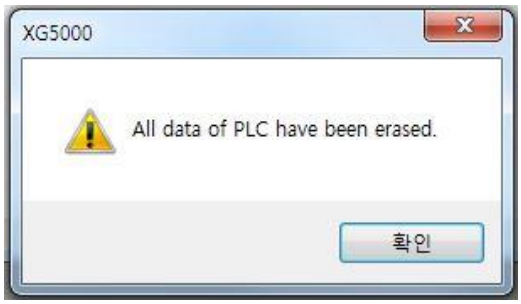
4) Click ‘Yes’ when the pop-up shows up



5) Connect PLC (RS232C or USB should be connected in advance)



6) There is a pop-up message which means the data, passwords, program of PLC is already removed



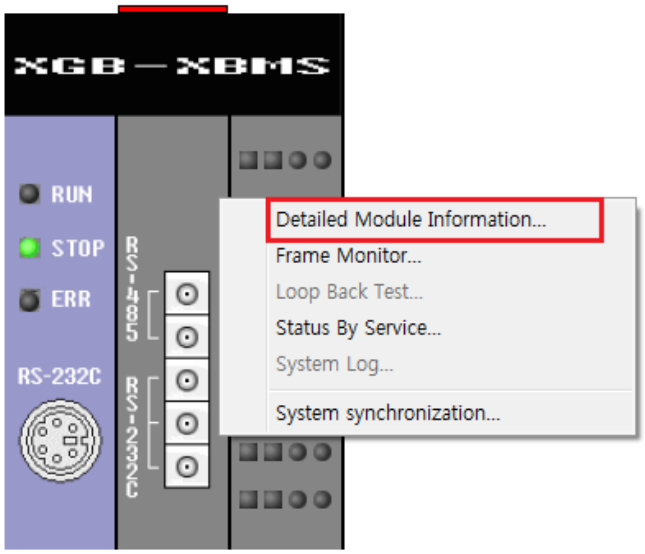
1.2 Built-in C-net Diagnosis

With XG5000 used, the status of system and the network can be checked and diagnosed (XGB Modular type PLC, XGB Compact PLC).

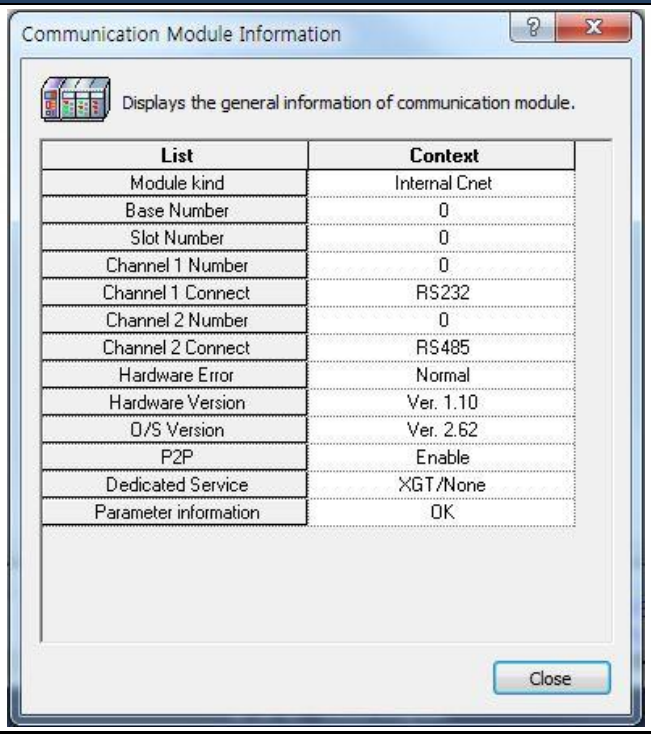
Connect PLC via RS232C or USB,

1) Select [**Online**] → [**Communication module setting**] → [**System diagnosis**]

   Click the right button on the Cnet I/F module in the **[System diagnosis]**, and select [**Detailed Module Information**]



<System diagnosis Window>

Check List	Detail Result
Communication Module Information	

Meaning of each item in communication module information is as follows:

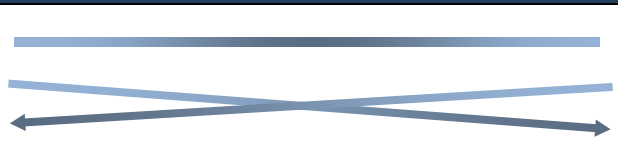
Item	Description	Ref.
Module type	Information of module type under diagnosis	
Base number	Base information of communication module under diagnosis. It is fixed as 0 at XGB PLC.	
Slot number	Slot number of communication module under diagnosis. In case of built-in communication. It is fixed as 0.	
Station Number	Station no. of relevant channel used at dedicated service, P2P	
Connection Method	Information of communication type (RS-232C, RS-422) of relevant channel	
Hardware error	Indicates whether hardware of communication module is normal or not.	
Hardware version	Version of communication module hardware	
OS version	Indicates version of communication module OS	
P2P	Indicates whether P2P communication is activated or not	
System Parameter Information	Whether standard communication parameter is downloaded or not Standard communication parameter error information expression	

Built-in communication channel (RS-232C/RS-485) uses 5-pin connector (Terminal Block) for communication with external devices. The names and functions of pins and data directions are as shown in [Figure 12.5.4] below

Pin no.	Name	Content	Signal direction (Cnet I/F module ↔ external device)	Function description
1	485 -	485 – Signal		Built-in RS485 – signal
2	485 +	485 + Signal		Built-in RS485 + signal
3	SG	Signal Ground		Signal ground
4	TX	Transmitted data		Built-in RS232C TX data signal
5	RX	Received data		Built-in RS232C RX data signal

Built-in RS-232C channel doesn't support modem communication. In case of modem communication, use XBC-C21A.

Connection method in case of using built-in RS-232C:

Pin no.	Name	Connection no. and signal direction	PC/Communication device Name
3	SG		SG
4	TX		TXD
5	RX		RXD

Connection method in case of using built-in RS-485

.

Pin no.	Name	Signal directin (Cnet I/F module ↔ external device)	External communication device
1	485 -		485 -
2	485 +		485 +

1.2.1 Communication Diagnosis by Frame Analysis

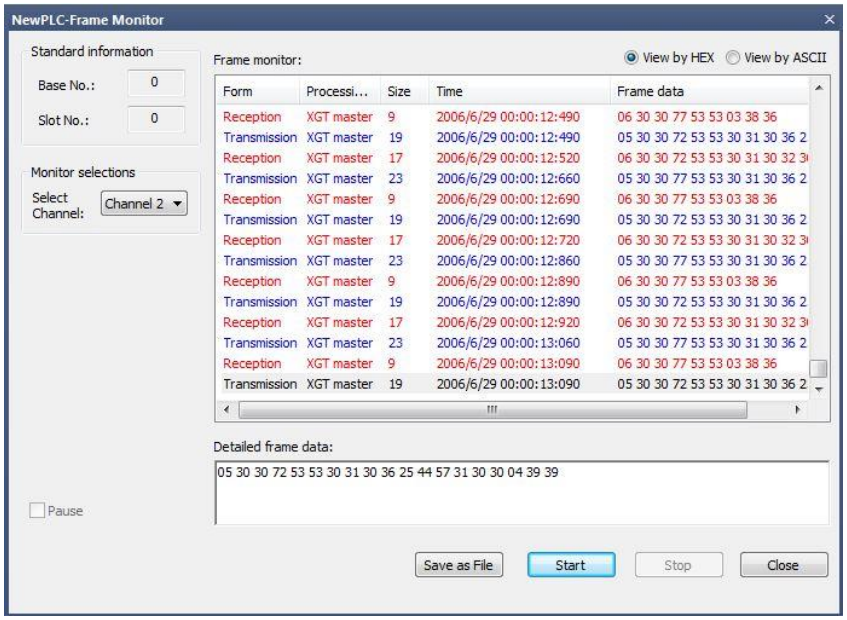
■ **Communication status diagnosis via [Frame Monitor] function**

The user can check whether the frame is normal or not by monitoring "Frame Monitor" in XG5000.

Connect PLC via RS232C or USB

2) Select [**Online**] → [**Communication module setting**] → [**System diagnosis**]

3) Click the right button on the Cnet I/F module in the **[System diagnosis]**, and select [**Frame Monitor**].

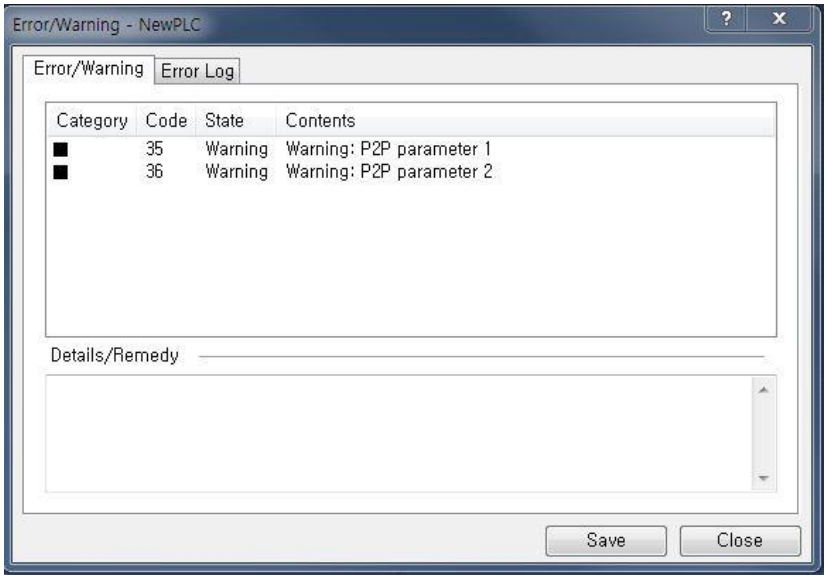
Check List	Detail Result
Frame Monitor	 <P2P Communication frame betwenn XBC-H and XBM PLC >

The information on Frame monitor is described as below:

Item		Description	Ref.
Standard information	Base No,	Information of base number under diagnosis	
	Slot No.	Information of slot number under diagnosis	
Monitor selections	Select Channel	Select channel to monitor	
Frame monitor window	Form	Indicates whether it is TX or RX frame.	
	Result	Indicates the protocol type 1) XGT server 2) XGT client 3) Modbus server 4) Modbus client 5) User definition frame 6) Unknown: frame that Cnet can't deal with	
	Size	Size of frame	
	Time	Time when sending/receiving the frame In case main unit is standard type (XBM-D***S), it indicates elapsed time from start	
	Frame data	Indicates the frame data	
View by HEX		Indicates the frame data as HEX	
View by ASCII		Indicates the frame data as ASCII	
Save as file		Save frame data as *.CSV file	
Start		Starts the frame monitor	
Stop		Stops the frame monitor	
Close		Closes the frame monitor window	

1.2.2 Troubleshooting by Error

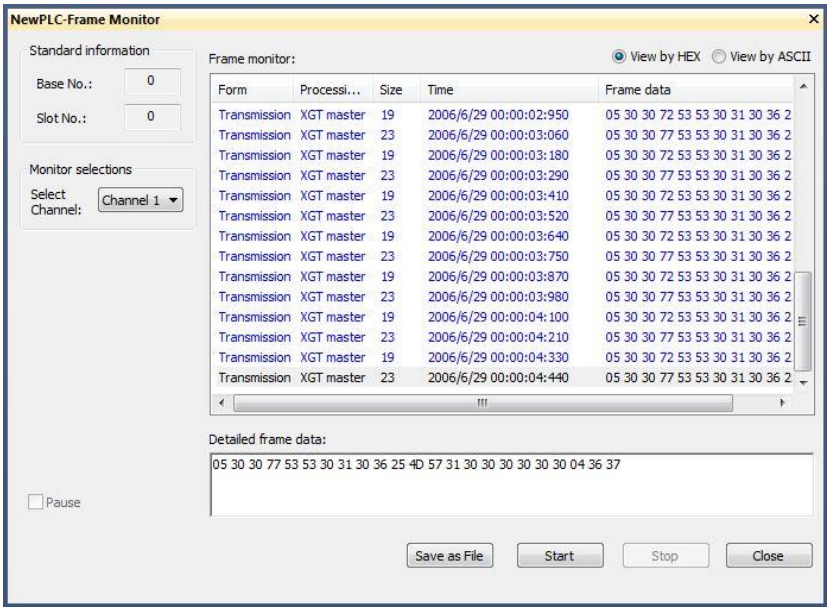
■ **P2P parameter setting error occurs in case of XG5000 connection**

Item	Detail result
P2P parameter setting error occurs in case of XG5000 connection	

If above error occurs, please check following contents:

Phenomenon	Cause	Recommended action
P2P setting error warning	In case of enabling link, the user enabled the link where P2P is not set.	1. In Enable Link menu of XG5000, check P2P setting number and delete P2P number not selected properly. 2. After disconnecting XG5000, connect XG5000 again and check

■ Troubleshooting when response frame is missed

Item	Detail result
Frame Monitor	

<Response frames are missed>

If above error occurs, please check following contents:

Item	Description	Remark
Wiring stauts	Check whether the wired correctly via RS232C/485 communication	
Communication speed	Adjust communication speed considering local environment	

Troubleshooting when response frame is missed in case of acting as client and using RS-485

Phenomenon	Cause	Recommended action
After setting diverse P2P parameter in P2P block, if frame monitor is executed, response frame is missed.	In case P2P conditional flag is faster than communication time	Consider communication time and change P2P conditional flag. • Communication time = transmission time + receive time • Transmission time = conditional flag + CPU scan time + communication module response time + data transmission time • Receive time = CPU scan time + communication module response time + data transmission time
	In case that response time of partner is slow.	Increase Delay time in standard settings of XG5000

■ Troubleshooting when unknown TRX frames transmitting

Phenomenon	Cause	Recommended action
Transmitting unknown data which cannot be analyzed	More than one server sends frame	• Execute 1:1 communication with server and check whether it works properly • Take interlock for servers not to sends frame simultaneously.
	In case parity bit setting is not coincident	Set the parity bit to be same each other
	In case stop bit setting is not coincident	Set the stop bit to be same each other
	In case communication speed setting is not coincident	Set the communication speed to be same each other
	In case of multi drop, terminal resistance is not installed	Install terminal resistance

■ Unable to know which communication error occurred, client or server

Phenomenon	Cause	Recommended action
Unable to know which one is reason of error, client or server	-	1. Check Cnet I/F module - Check module's equipment status - Check wiring 2.Check main unit status

If above erros cannot be troubleshoot, please contact the nearest Service Center.

1.3 Built-in Position Control Diagnosis

1.3.1 How to Check Error Code

If position control error occurs, it should be troubleshoot by checking error codes in XG5000.

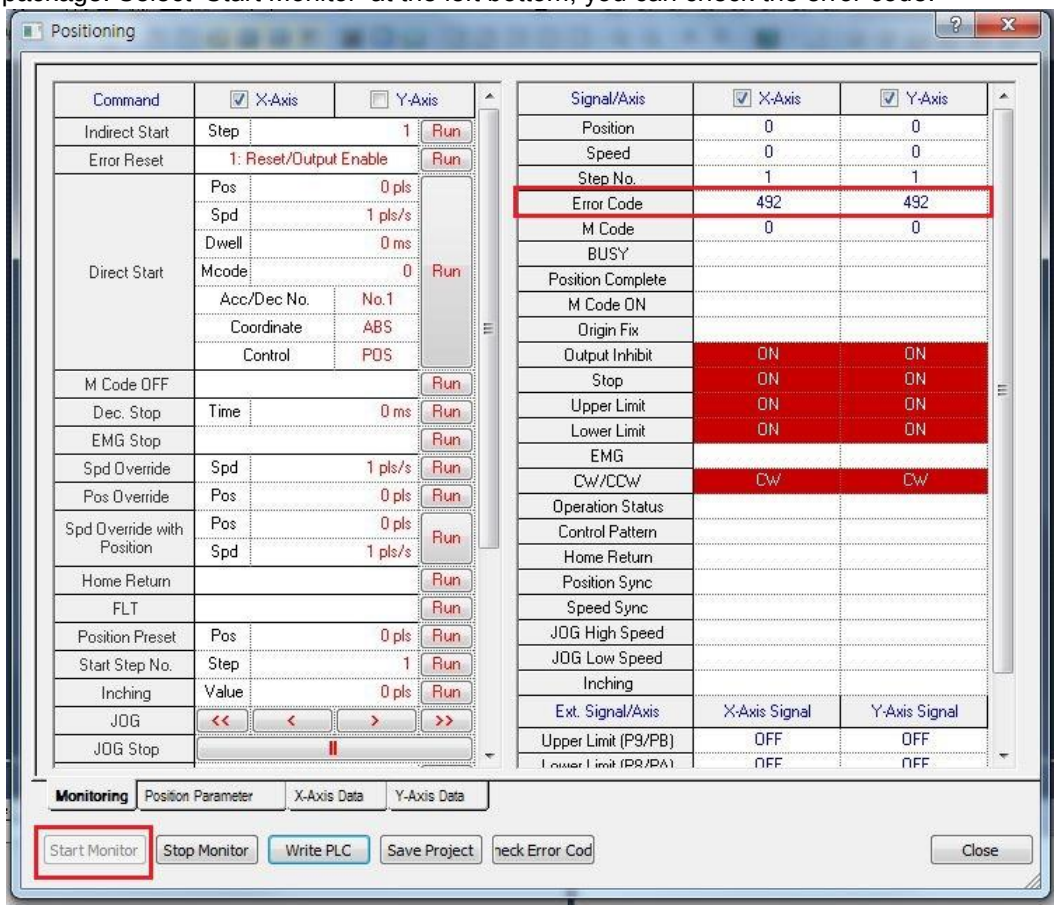
■ **How to Check Error Codes**

The built-in positioning error code can be checked by using the XGB positioning monitoring package or the positioning error code device of area K in the following procedure.

Positioning Monitoring Package

1) Access PLC with XG5000

2) Select [**Monitor**] → [**Special module monitoring**] → [**Position module**] to execute following monitoring package. Select 'Start Monitor' at the left bottom, you can check the error code.



Positioning Area K

1) You can check the error code by using the device monitor function of XG5000

2) To check the error code of the XGB positioning function, monitor the following device. Please refer to 'XG5000 User's Manual' to use Device monitor function.

	Area K address	Data size
Axis X	K427(%KW427)	Word
Axis Y	K437(%KW437)	Word

1.3.2 Check by Using the LED

If there is trouble during use of the positioning function, check the PWR LED, RUN LED and ERR LED of XGB PLC, and check the relative input/output LED of position control.

■ If the pulse output mode is PLS/DIR:

Signal	Contact Point	LED status	Recommended action
Pulse output	P20, P21 Q00, Q01	Fast flashing	Pulse is being normally output by the positioning function Check whether there is a problem with the lines of the XGB and motor driver.
		Off	Pulse is not being normally output • Positioning operation has finished (normal) → Start the next operation instruction. • There is an error that makes positioning operation impossible → check the positioning error code and remove the cause.

Signal	Contact point	LED status	Output level	Recommended action
Direction output	P22, P23 Q02, Q03	On	Low active	Direction signals are being output in the normal direction (normal).
			High active	Direction signals are being output in the reverse direction (normal). • Pulse is not being normally output → Start the next operation instruction • There is an error that makes positioning operation impossible → Check the positioning error code and remove the cause
		Off	Low active	Direction signals are being output in the reverse direction (normal). • Pulse is not being normally output → Start the next operation instruction • There is an error that makes positioning operation impossible → Check the positioning error code and remove the cause
			High active	Direction signals are being output in the normal direction (normal).

■ **If the pulse output mode is CW/CCW**

Signal	CW contact point	CCW contact point	Recommended action
CW output	Flashing	Off	CW pulse is being normally output (normal).
		Flashing	The pulse is being abnormally output Contact an A/S office or customer center
	Off	Off	• Pulse is not being normally output → Start the next operation instruction • There is an error that makes positioning operation impossible → Check the positioning error code and remove the cause
		Flashing	CCW pulse is being normally output (normal).

If above errors cannot be troubleshoot, please contact the nearest Service Center.

1.3.3 If the Motor Doesn't Work

If the motor still does not work after troubleshoot by LED, please check following contents.

Lines between XGB and Motor Driver

- Check whether the lines between XGB and servo motor driver are connected correctly.
- Check the specifications for input/output wiring of XGB.

Motor Driver Setting

- If there is no problem with the wiring, check whether the input pulse of the motor driver is the same as that of the XGB.
- XGB only supports the open collector type. Check your motor driver whether support that type. Moreover, please check the setting of the motor driver.

Motor Driver checking

- If the problem still exists after chekced by above steps, then use an oscilloscope to check whether the pulse is actually supplied to the motor driver. If the motor driver isn't working despite the pulse actually being supplied, refer to the manual of the motor driver and check whether there is an error of the driver.

2 Maintenance

Be sure to perform daily and periodic maintenance in order to maintain the PLC in the best conditions.

2.1 Maintenance

The I/O module mainly consists of semiconductor devices and its service life is semi-permanent. However, periodic inspection is requested for ambient environment may cause damage to the devices. When inspecting one or two times per six months, check the following items.

Item		Judgement	Corrective action
Input voltage		Within changre rate of input voltage (Less than -15% / +20%)	Hold it with the allowalbe range
Power supply for input/output		Input/Output specification of each module	Hold it with the allowable range of each module
Ambient Environment	Temperature	0 ~ +55℃	Adjust the operating temperature and humidity with the defined range
	Humidity	5 ~ 95%RH	
	Vibration	No vibration	Use viberation resisting rubber or any other prevention method
Play of modules		No play allowed	Securely enrage the hook
Connecting conditions of terminal screws		No loose allowed	Retighten terminal screws
Spare parts		Check the number of spare parts and their store conditions	Cover the shortage and improve the conditions

2.2 Daily Inspection

The following table shows the inspection and items which to be chekced daily.

Item		Check points	Judgement	Corrective action
Connection conditions of base		Check the screws	Screws should not be loose	Retighten screws
Connection conditions of input/output module		Check the connecting screws Check module cover	Screws should not be loose	Retighten screws
Connecting conditions of terminal block or extension cable		Check for loose mouting screws	Screws should not be loose	Retighten screws
		Check the distance between solderless terminals	Proper clearance should be provided	Correct
		Connecting of expansion cable	Connector should not be loose	Correct
LED	PWR LED	Check that the LED is On.	On(Off indicates an error)	Refer to Chapter 1
	RUN LED	Check that the LED is On during Run.	On (flickering indicates an error)	Refer to Chapter 1
	ERR LED	Check that the LED is Off during Run.	Off(On indicates an error)	Refer to Chapter 1
	Input LED	Check that the LED turns On and Off.	On when input is On, Off when input is off.	Refer to Chapter 1
	Ouput LED	Check that the LED turns On and Off	On when output is On, Off when output is off	Refer to Chapter 1

2.3 Periodic Inspection

Item		Checking methods	Judgement	Corrective action
Ambient environment	Ambient temperature	- measure with thermometer and hygrometer - measure corrosive gas	0 ~ +55℃	Adjust to general standard (Internal environmental standard of control section)
	Ambient Humidity		5 ~ 95%RH	
	Ambient pollution level		There should be no corrosive gases	
PLC Conditions	Looseness, Ingress	The module should be move the unit	The module should be mounted securely.	Retighten screws
	dust or foreign material	Visual check	No dust or foreign material	
Connecting conditions	Loose terminal screws	Re-tighten screws	Screws should not be loose	retighten
	Distance between terminals	Visual check	Proper clearance	Correct
	Loose connectors	Visual check	Connectors should not be loose.	Retighten connector mounting screws
Line voltage check		Measure voltage between input terminals	DC24V: DC20.4 ~28.8V	Change supply power

3 Error Code List

3.1 CPU

Code	Item	Recommended action	Operation status	LED status	Diagnosis point
23	Program to execute is abnormal	Start after reloading the program	Warning	0.5 second Flicker	RUN mode
24	I/O parameter error	Start after reloading I/O parameter, Battery change if battery has a problem. Check the preservation status after I/O parameter reloading and if error occurs, change the unit.	Warning	0.5 second Flicker	Reset RUN mode switching
25	Basic parameter error	Start after reloading Basic parameter, Change battery if it has a problem. Check the preservation status after Basic parameter reloading and if error occurs, change the unit.	Warning	0.5 second Flicker	Reset RUN mode switching
30	Module set in parameter and the installed module does not match	Modify the module or parameter and then restart.	Warning	0.5 second Flicker	RUN mode switching
31	Module falling during operation or additional setup	After checking the position of attachment/detachment of expansion module during Run mode	Warning	0.1 second Flicker	Every scan
33	Data of I/O module does not access normally during operation.	After checking the position of slot where the access error occurs by XG5000, change the module and restart (acc.to parameter.)	Heavy error	0.1 second Flicker	Scan end
34	Normal access of special/link module data during operation not available	After checking the position of slot that access error occurred by XG5000, change the module and restart (acc.to parameter).	Heavy error	0.1 second Flicker	Scan end
39	Abnormal stop of CPU or malfunction	Abnormal system end by noise or hard ware error. 1) If it occurs repeatedly when power reinput, request service center 2) Noise measures	Heavy error	0.1 second Flicker	Ordinary time
40	Scan time of program during operation exceeds the scan watchdog time designated by parameter.	After checking the scan watchdog time designated by parameter, modify the parameter or the program and then restart.	Warning	0.5 second Flicker	While running the program

Code	Item	Recommended action	Operation status	LED status	Diagnosis point
41	Operation error occurs while running the user program.	Remove operation error → reload the program and restart.	Warning	0.5 second Flicker	While running the program
44	Timer index user error	After reloading a timer index program modification, star	Warning	0.5 second Flicker	Scan end
50	Heavy error of external device	Refer to Heavy error detection flag and modifies the device and restart. (Acc. Parameter)	Warning	0.1 second Flicker	Scan end
60	E_STOP function executed	After removing error causes which starts E_STOP function in program, power reinput	Heavy error	0.1 second Flicker	While running the program
500	Data memory backup not possible	If not error in battery, power reinput Remote mode is switched to STOP mode.	Warning	1 second Flicker	Reset
501	Abnormal clock data	Setting the time by XG5000 if there is no error	Warning	1 second Flicker	Ordinary time
502	Battery voltage falling	Battery change at power On status	Warning	1 second Flicker	Ordinary time

3.2 Built-in C-NET

3.2.1 XGT Server Error code

Error code is displayed as hex 2 byte (4 byte as ASCII code). The user can see error by frame monitor and in case of viewing by ASCII, the user can see the following error code.

Code	Item	Description	Example
0003	Number of blocks exceeded	Number of blocks exceeds 16 at Individual Read/Write Request	01rSS1105%MW10…
0004	Variable length error	Variable Length exceeds the max. size of 16	01rSS113%MW1000000…
0007	Data type error	Other data type than X,B,W,D,L received	01rSS1105%MK10
0011	Data error	Data length area information incorrect	01rSB05%MW%4
		In case % is unavailable to start with	01rSS1105$MW10
		Variable’s area value wrong	01rSS1105%MW^&
		Other value is written for Bit Write than 00 or 01	01wSS0105$MX1011
0090	Monitor execution error	Unregistered monitor execution r equested	
0190	Monitor execution error	Reg. No. range exceeded	
0290	Monitor reg. Error	Reg. No. range exceeded	
1132	Device memory error	Other letter than applicable device is input	
1232	Data size error	Request exceeds the max range of 60 Words to read or write at a time.	01wSB05%MW1040AA5512
1234	Extra frame error	Unnecessary details exist as added.	01rSS0105%mw10000

Code	Item	Description	Example
1332	Data type discordant	All the blocks shall be requested of the identical data type in the case of Individual Read/Write	01rSS0205%MW1005%MB10
1432	Data value error	Data value unavailable to convert to Hex	01wSS0105%MW10AA%5
7132	Variable request area exceeded	Request exceeds the area each device supports.	01rSS0108$MWFFFFF

3.2.2 Modbus Server Error Code

Error code is displayed as hex 1 byte (2 byte as ASCII code) and indicates type of error.

Code	Item	Description
01	Illegal Function	Function code error
02	Illegal Address	Address range exceeded
03	Illegal Data Value	Data value not allowed

3.2.3 P2P Client Error Code

Indicates error code shown at monitoring window of XG5000

Code	Item	Description
01	ERR_NO_HEAD	There is no head of receive frame
02	ERR_NO_TAIL	There is no tail of receive frame
03	ERR_WRONG_BCC	BCC is not correct
04	ERR_STATION_NO	Station number of receive frame is not correct
05	ERR_WRONG_DRV_TYPE	Driver type is not correct
07	ERR_FRAME_SND	Can’t send TX frame
09	ERR_NO_USE_LINKID	There is no communication module
0A	ERR_PLC_RESP_TIMEOUT	Receive frame is not received during time out setting time
0B	ERR_FRM_LENGTH	Length of receive frame is not correct
0D	ERR_ASCII_HEX_ERR	ASC-HEX conversion of receive frame is not correct
0E	ERR_RANGE_OVER	Area of device is exceeded
0F	ERR_NAK_ERR	Response of receive frame is NAK

3.3 Built-in Position Control

Code	Description	Status	Recommended action
101	Exceeding the max speed range of basic parameter	Stop	Change the max speed value

Code	Description	Status	Recommended action
102	Exceeding the bias speed of basic parameter 1) bias speed ≥ Speed limit 2) bias speed = 0	Stop	Re-adjust it lower then the max speed of basic parameter.
103	ACC time setting error 1) ACC time > 10,000 2) Jog ACC time > 10,000	Stop	Re-adjust ACC time of basic parameter lower than 10,000
104	DEC time setting error 1) DEC time > 10,000 2) Jog DEC time > 10,000	Stop	Re-adjust DEC time of basic parameter lower than 10,000
105	Setting non use dedicated positioning at parameter	Stop	Setting dedicate positioning.
111	Expansion parameter soft upper/lower limit error • S/W upper > S/W lower	Stop	Re-adjust S/W upper limit equal to or larger than the lower limit.
121	Manual operation parameter jog high speed range exceeding error 1) Jog high speed < bias speed 2) Jog high speed > > max speed 3) Jog high speed = 0 4) Jog high speed < Jog low speed	Stop	Re-adjust to be max speed≥jog high speed≥bias speed
122	Manual operation parameter jog low speed range exceeding error 1) Jog low speed < bias speed 2) Jog low speed > max speed 3) Jog low speed = 0 4) Jog low speed > Jog high speed	Stop	Re-adjust to be jog high speed≥jog low speed≥ 1.
123	Manual operation parameter inching speed range exceeding error 1) inching speed < bias speed 2) inching speed > > max speed	Stop	Re-adjust to be max speed ≥ inching speed ≥ bias speed
131	Home return parameter home return mode value range exceeding error	Stop	Re-adjust to be 0 < home return parameter ≤ 3. (1:Dog/origin(On) 2:upper/lower limit/origin 3:DOG)
132	Home return parameter home return address range exceeding error	Stop	Re-adjust to be S/W upper limit ≥ home return address≥ S/W lower limit
133	Home return parameter home return high speed range exceeding error 1) home return high speed < bias speed 2) home return high speed > max speed	Stop	Re-adjust to be max speed ≥home return high speed ≥ bias speed
134	Home return parameter home return low speed range exceeding error 1) home return low speed < bias speed 2) home return low speed > home return high speed	Stop	Re-adjust to be home return high speed ≥home return low speed≥bias speed
135	Home return dwell time out error of home return parameter • Home return dwell time > 50,000	Stop	Re-adjust dwell time lower than 50000.
136	Home return ACC time setting error • Home return ACC time > 10,000	Stop	Re-adjust home return ACC time lower than 10,000
137	Home return DEC time setting error • Home return DEC time > 10,000	Stop	Re-adjust home return Dec time lower than 10,000.
151	Operation speed ‘0’ setting error of operation data	Stop	Set operation speed over ‘0’.

Code	Description	Status	Recommended action
152	Operation speed of operation data exceeding the max speed	Stop	Re-adjust to be max speed ≥ operation speed.
153	Operation speed of operation data set lower than bias speed.	Stop	Re-adjust to be operation speed ≥ bias speed.
154	Exceeding dwell time setting range of operation data	Stop	Set dwell time lower than 50000.
155	Exceeding end/continuous/sequential setting range of operation data	Stop	Re-set operation pattern of operation data as one of 0:end, 1:continuous or 2:sequential
201	Home return command is unavailable during operation	Operation	Check whether command axis was not operating at the time of home return command.
202	Home return command is unavailable in case of ‘no output’ status.	Stop	Check whether command axis was not in ‘no output’ status at the time of home return command.
211	Floating origin setting command is unavailable during operation.	Operation	Check whether command axis was not operating at the time of floating origin setting command.
221	Direct start command is unavailable during operation.	Operation	Check whether command axis was not operating at the time of direct start command
222	Direct start command is unavailable in case of ‘no output ’ status.	Stop	Check whether command axis was not in ‘no output’ status at the time of direct start command.
223	Direct start command is unavailable in case of M code On	Stop	Check whether M code of command axis was not On at the time of direct start command.
224	Direct start command is unavailable without origin set in absolute coordinate.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.
231	Indirect start command is unavailable during operation	Operation	Check whether command axis was not operating at the time of indirect start command.
232	Indirect start command is unavailable in case of ‘no output’ status.	Stop	Check whether command axis was not in ‘no output’ status at the time of indirect command.
233	Indirect start command is unavailable in case of M code On.	Stop	Check whether M code signal of command axis was not On at the time of indirect start command.
234	Indirect start command is unavailable without origin set in absolute coordinate.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.
236	Continuous operation of indirect start is unavailable in speed control.	Stop	Re-set single or continuous operation if operation data control method is speed
241	Linear interpolation start is unavailable when main axis of linear interpolation s operating.	Operation	Check whether main axis was not operating at the time of linear interpolation command.
242	Linear interpolation start is unavailable when sub axis of linear interpolation is operating.	Operation	Check whether sub axis was not operating at the time of linear interpolation command.
244	Linear interpolation start is unavailable when main axis of linear interpolation is in ‘Output disabled’ status.	Stop	Check whether main axis was not in ‘Output disabled’ status at the time of linear interpolation command..

Code	Description	Status	Recommended action
245	Linear interpolation start is unavailable when sub axis of linear interpolation is in 'Output disabled' status.	Stop	Check whether a sub axis was not in 'Output disabled' status at the time of linear interpolation command.
247	Linear interpolation start is unavailable when the M code signal of linear interpolation's main axis is On.	Stop	Check whether M code signal of main axis was not On at the time of linear interpolation command.
248	Linear interpolation start is unavailable when M code signal of linear interpolation's sub axis is On.	Stop	Check whether M code signal of sub axis was not On at the time of linear interpolation.
250	Absolute coordinate positioning operation is unavailable when the origin of linear interpolation sub axis is not set.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.
251	Absolute positioning operation is unavailable when the origin of linear interpolation's sub axis is not set.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.
253	Main axis and sub axis of linear interpolation are set incorrectly.	Stop	Re-set the axis date as 3 of linear interpolation command.
257	Linear interpolation is not available when the target position of main axis does not have a target position.	Stop	Check whether the target position of operation data of a step for linear interpolation was not the present status in case of absolute coordinate or set to '0' in case of Incremental coordinate.
258	Linear interpolation is unavailable when main axis is controlling speed.	Stop	Check whether the control method of main axis operation data step for linear interpolation operation was not set by speed control.
259	Linear interpolation is unavailable when sub axis is controlling speed.	Stop	Check whether the control method of sub axis operation data step for linear interpolation was not set by speed control.
291	Concurrent start command is unavailable during operation.	Operation	Check whether an axis with error was not contained in concurrent start command and whether there wasn't any operating axis at the time of the command
292	Concurrent start command is unavailable in 'no output' status.	Stop	Check whether an axis with error was not contained in concurrent start command and whether it was not in 'no output' status at the time of the command.
293	Concurrent start command is not available with M code On	Stop	Check whether an axis with error was not contained in concurrent start command and whether M code signal was not On at the time of the command.
294	Concurrent start command is unavailable without origin set	Stop	Concurrent start command with origin set
296	When concurrent start command axis is incorrectly set.	Stop	Re-set the axis date as 3 of concurrent start command
301	Speed/position switching command is unavailable while not operating.	Stop	Check whether an axis did not stop at the time of speed/position switching command.

Code	Description	Status	Recommended action
302	Speed/position switching command is unavailable while not controlling speed.	Stop	Check whether an axis was not in speed control status at the time of speed/position switching command.
304	Speed/position switching command is unavailable without target position.	Stop	Check whether operation had move(amount) at the time of speed/position switching command.
311	Position/speed switching command is unavailable while not operating.	Stop	Check whether an axis did not stop at the time of position/speed switching command.
312	Position/speed switching command is unavailable On a sub axis of synchronic operation.	Stop	Check whether an axis was operating as a synchronic operation sub axis at the time of position/speed switching command.
314	Position/speed switching command is unavailable during inear operation.	Operation	Check whether an axis was not in linear interpolation operation at the time of position/speed switching command.
321	DEC stop command is unavailable while not operating.	Stop	Check whether it was not operating at the time of DEC stop command.
322	DEC stop command is not available during jog operation.	Operation	Check whether it was not jog-operating at the time of DEC stop command.
341	Position synchronic command is not available during operation	Operation	Check whether an axis was not in operating at the time of position synchronic command
342	Position synchronic command is unavailable in ‘no output’ status.	Stop	Check whether an axis was not in ‘no output’ status at the time of position synchronic command.
343	Position synchronic command is unavailable with M code On.	Stop	Check whether M code signal of an axis was not On at the time of position synchronic command.
344	Position synchronic command is unavailable without origin set.	Stop	Absolute coordinate operation is not available without origin set. Check whether operation data to operate and the current origin set.
346	Position synchronic command is unavailable without origin of main axis set.	Stop	Check whether main axis was without origin set at the time of position synchronic command.
347	There is an error of setting main/sub axis of position synchronic command.	Stop	Check whether main axis of position synchronic command was not set equally with command axis.
351	Speed synchronic command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of speed synchronic command.
352	Speed synchronic command is unavailable in ‘no output’ status.	Stop	Check whether an axis was not in ‘no output’ status at the time of speed synchronic command.
353	Speed synchronic command is unavailable with M code On	Stop	Check whether M code signal of an axis was not On at the time of speed synchronic command.
355	There is an error of main/sub axis setting of speed synchronic command. 1) main/ sub axis were set equally 2) set of main axis >5	Stop	Check whether the main axis of speed synchronic command was not set equally with command axis..
356	There is an error of synchronization ratio setting of speed synchronic command	Stop	Check whether the synchronization ratio of speed synchronic command was not set between 0~10,000..

Code	Description	Status	Recommended action
357	Delay time setting error	Stop	Check whether delay time was set between 1 ~ 10ms.
359	Speed synchronize command is main axis that cannot set the sub axis's.	Stop	Check the main axis of speed synchronize command is operated by sub axis.
361	Position override command is unavailable in any other status but 'busy'	Stop	Check whether an axis did not stop at the time of position override command.
362	Position override command is unavailable during dwelling	Stop	Check whether an axis was not dwelling at the time of position override command.
363	Position override command is unavailable in any other status but positioning operation.	Operation	Check whether an axis was not operating by position control at the time of position override command.
364	Position override command is unavailable for an axis of linear interpolation operation.	Operation	Check whether an axis was not in linear-interpolation operation at the time of position override command.
366	Position override command is unavailable for a synchronic operation sub axis.	Operation	Check whether an axis was not operating as a sub axis of synchronic operation at the time of position override command.
371	Speed override command is unavailable in any other status but 'busy'.	Stop	Check whether an axis did not stop at the time of speed override command.
372	Out-of speed override range error	Stop	Re-set the speed of speed override command equal to or lower than the max speed set in the basic parameter.
373	Speed override command is unavailable to an sub axis of linear interpolation operation.	Operation	Check whether an axis was not operating as a sub axis of linear interpolation at the time of speed override command.
375	Speed override command is unavailable to an sub axis of synchronic operation	Operation	Check whether an axis was not operating as a sub axis of synchronic operation at the time of speed override command.
377	Speed override command is unavailable in a DEC section	Operation	Check whether an axis was not decelerating for stoppage at the time of speed override command.
381	Positioning speed override command is unavailable in any other status but 'operation'.	Stop	Check whether an axis did not stop at the time of positioning speed override command.
382	Positioning speed override command is unavailable in any other operation but 'positioning operation'	Stop	Check whether an axis was not in speed control operation at the time of positioning speed override.
383	Out of speed override range error of positioning sped override command	Stop	Check whether the speed of positioning speed override command was not equal to or lower than the max speed set in parameter.
384	Positioning speed override command is unavailable to an sub axis of linear interpolation operation.	Operation	Check whether an axis was not operating as a sub axis of linear interpolation at the time of positioning speed override command.
386	Positioning speed override command is unavailable to an sub axis of synchronic operation.	Operation	Check whether an axis was not operating as a sub axis o synchronic operation at the time of positioning speed override command.

Code	Description	Status	Recommended action
401	Inching command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of inching command.
402	Inching command is unavailable in 'no output' status.	Stop	Check whether an axis was not in 'no output' status at the time of inching command.
411	Jog start command is unavailable during operation.	Operation	Check whether an axis was not operating at the time of jog start command.
412	Jog start command is unavailable in 'no output' status.	Stop	Check whether an axis was not in 'no output' status at the time of jog start command.
441	Start step number change/repeat operation start step number designation command is unavailable during operation.	Operation	Check whether the step number of start step number change command or repeat operation start step number designation command is equal to or higher than 1 and lower and 30(80 for high end) or within the range.
442	Start step number change/repeat operation start step number command is unavailable during operation. 1) Step = 0 2) Step > 30(80 for high end)	Stop	Check whether an axis was not operating at the time of present position present command.
451	Present position preset command is unavailable during operation.	Operation	Check whether the position of present position present command was within the soft upper/lower limits.
452	Sub position data may not be set exceeding soft upper/lower limits at the time of present position preset command.	Stop	Check whether the position of present position present command was within the soft upper/lower limits.
481	emergency stop error	Stop	Remove emergency stop causes and clear the error by executing CLR command.
491	External emergency stop error	Stop	Remove emergency stop causes and clear the error with CLR command.
492	Hard upper limit error	Stop	Escape from external upper signal range by using jog command and clear the error with CLR command.
493	Hard lower limit error	Stop	Escape from external upper signal range by using jog command and clear the error with CLR command.
501	Soft upper limit error	Stop	Escape from soft upper limit range by using jog command and clear the error with CLR command.
502	Soft lower limit error	Stop	Escape from soft lower limit range by using jog command and clear the error with CLR command.
511	Direction turning error during sequential operation	Stop	Check whether the directions are turned during sequential operation.
512	Step number error during indirect start.	Stop	A step over 30 was set in a command. Re-set step number between 1 ~ 30.
513	Address error during indirect start.	Stop	Check whether it repetitively operates a step of which address is '0' during indirection start.
601	PWM command cannot be executed during operation	Operation	Check whether executed PWM command during operation

Code	Description	Status	Recommended action
602	PWM command cannot be excuted during output disbled status	Stop	Check whether executed PWM command during output disabled status
603	PWM command output frequency setting range exceed error	Stop	Check whether PWM command output frequency range is 1~20,000.
604	PWM command Off-duty setting range exceed error	Operation /Stop	Check whether PWM command Off-duty range is 0~100.
605	Speed override command cannot be executed during PWM output	Operation	Check whether executed speed override command during PWM output
606	position/speed control convertting command cannot be executed during PWM output	Operation	Check whether executed position/speed control converting command during PWM output

3.4 Built-in PID Function

3.4.1 Error Code

The error codes of XGB Built-in PID function as below:

Code	Item	Measures	Ref.
H0001	MV_MIN_MAX_ERR	It occurs when max. MV is set lower than min. MV. Make sure to set max. MV larger than min. MV.	
H0002	PV_MIN_MAX_ERR	It occurs when max. PV is set lower min. Pv. Make sure to set max. PV larger than min. PV.	
H0003	PWM_PERIOD_ERR	It occurs when the period of auto tuning or PID operation loop is set under 100(10ms). Make sure to set output period more than 100.	
H0004	SV_RANGE_ERR	It occurs when SV is larger than PV at the start time of auto-tuning if auto-tuning is forward or when SV is larger than PV at the start time of auto-tuning if auto-tuning is reverse.	
H0005	PWM_ADDRESS_ERR	It occurs when the junction designated as PWM output junction is beyond between P20 ~ P3F.	
H0006	P_GAIN_SET_ERR	It occurs when proportional constant is set lower than 0.	
H0007	I_TIME_SET_ERR	It occurs when integral time is set lower than 0.	
H0008	D_TIME_SET_ERR	It occurs when differential time is set lower than 0.	
H0009	CONTROL_MODE_ERR	It occurs when control mode is not P, PI, PD or PID.	
H000A	TUNE_DIR_CHG_ERR	It occurs when operation direction is changed during autotuning. Never attempt to change operation direction during auto-tuning..	
H000B	PID_PERIOD_ERR	It occurs when period of operation is smaller than 100 (10ms) at Auto-tuning or PID operation. Make sure to set period of operation larger than 100.	
H000C	HBD_WRONG_DIR	In mixed operation, It occurs when the direction parameter of forward operation set to reverse operation or the direction parameter of reverse operation set to forward operation. Make sure set to appropriate direction each loop.	
H000D	HBD_SV_NOT_MATCH	In mixed operation, it occurs when the Set value of each loop is not concurrent. Make sure set to Set value concurrently	

3.4.2 Warning Code

The error codes of XGB Built-in PID function as below:

Code	Item	Recommended action	Ref.
H0001	PV_MIN_MAX_ALM	It occurs when the set PV is beyond the min/max. PV.	
H0002	PID_SCANTIME_ALM	It occurs when PID operation cycle is too short. It is desirable to set PID operation cycle longer than PLC scan time.	
H0003	PID_dPV_WARN	It occurs when the PV change of PID cycle exceeds PV change limit.	
H0004	PID_dMV_WARN	It occurs when the PV cycle MV change exceeds MV change limit.	
H0005	PID_MV_MAX_WARN	It occurs when the calculated MV of PID cycle exceeds the max. MV.	
H0006	PID_MV_MIN_WARN	It occurs when the calculated MV of PID cycle is smaller than the min. MV	